2011 Biosolids Program Performance Report

Issued: December 2011

Introduction

The City of Mankato is located in south central Minnesota at the confluence of the Minnesota and Blue Earth Rivers. While the city of Mankato has a population of about 36,500 people the Mankato Wastewater Treatment Plant (WWTP) has a service population of approximately 50,000 people from 5 cities. The service area also includes 2 Sanitary Districts.

The original primary plant was built in the mid 1950's with major expansions occurring in 1974 for construction of a secondary treatment system and a capacity expansion in 2000 in addition to phosphorus and ammonia removal. The design capacity of the plant is 9.38 MGD, a maximum flow of 22.0 MGD and a hydraulic capacity of 44.0 MGD. Treatment currently consists of primary settling and chemical phosphorus removal, extended aeration to include ammonia removal, clarification and disinfection. The solids train includes DAF, anaerobic digestion, belt filter press, storage and land application.

A natural gas-fired turbine electrical generating plant utilizes up to 6.2 MGD of our effluent water for cool. In exchange for our effluent water the power company has built a 12 MGD phosphorus removal system on the effluent end, filtration and chlorination to meet California Title 22 Standards for Reuse Water. It is owned and located at the Mankato WWTP. In addition, effluent water is being used in the sprinkler system of a nearby city park. A new disposal station has been built with reuse water available for truck washing and a fill station for other uses such a sod establishment, street cleaning, etc.

The Mankato WWTP staff consists of eleven full-time positions. There are five operators, two maintenance, two laboratory, a plant foreman and a wastewater superintendent. The plant is staffed 8 hours per day 7 days per week. A SCADA system relays alarms to the Mankato Water Treatment Plant which is staffed 24 hours per day. One of the WWTP operators is on-call at all times. The laboratory normally has 2 interns from the local university to assist with sampling as well as projects such as sources of pollutants for our source reduction program and water quality sampling from internal watersheds to assist with community development planning.

The Mankato WWTP has Delegated Authority over its Pretreatment Program. Currently there are 8 Significant Industrial Users, 8 Categorical Industrial User and approximately 30 Industrial Users. The focus of the Pretreatment Program is to reduce pollutants at the source, to prevent upsets to the wastewater treatment plant, to prevent pass-through, and to improve the quality of the two

end products: Clean effluent water to the Minnesota River and quality biosolids for land application.

Three primary anaerobic digesters are heated with waste gas and then transferred to the secondary storage tank. Five days per week the biosolids are withdrawn and dewatered through a Belt Filter Press and stored on site in a covered bunker. After harvest in the fall the City's Street Division hauls the biosolids to nearby farmland. The city has about six farmers with several hundred acres participating in the land application program.

The Mankato WWTP was part of a third round of agencies participating in the National Biosolids Partnership (NBP) Biosolids Management Program (BMP) for biosolids. Development of our EMS program started in 2005 with the creation of an internal BMP team. Team members attended four NBP sponsored workshops which helped guide the development of our BMP. The City of Mankato applied for NBP certification and was certified in January 2010.

Outcomes Matter

The NBP has identified key outcomes which serve as good indicators of successful and well managed biosolids management practices. Efforts undertaken by the City of Mankato WWTP during the past year in support of these outcomes are detailed below.

Quality Management Practices

- Tracked maintenance activities to better determine program effectiveness. By monitoring the ratio between corrective work and preventive work we are able to determine how effective our maintenance programs are.
- Installed new Cl_2 analyzers in the water reclamation facility. These meters more accurately analyze the chlorine residual to reduce our chemical usage and save the plant money.
- The degree of compliance with our NPDES permit is an indicator of how effectively the facilities are being operated and managed. The plant maintained a compliance record of 100 % of 2011.
- Biosolids BMP and all related SOP's have been reviewed and updated and are in the share file to be utilized for document management.

Relations with Interested Parties

- Tours of the entire wastewater plant was offered to anyone interested.
- Brochures about the NBP and biosolids program are available on the city website as well as at the wastewater plant.

- Information about our biosolids management program and the NBP is on the city website along with contact information. The number of "hits" to the site is being monitored.

Regulatory Compliance

- Maintained 100% compliance with all regulatory requirements.

Environmental Performance

- The City of Mankato has completed its mercury minimization plan which is part of our new permit. The purpose of the mercury minimization plan is to evaluate collection and treatment system to determine possible sources of mercury as well as potential mercury reduction options.
- Calpine, a natural gas-fired electrical generating plant, has been using up to 6.2 MGD of effluent water used for cooling water instead of using ground water. The WWTP has been following California title 22 reuse water standards.
- Also by following the Title 22 reuse standards, the City of Mankato is using the effluent water from the WWTP for the sprinkler system at a nearby city park.
- Maintaining an effective maintenance management program at the wastewater plant helps ensure reliable equipment and operations and helps to prevent accidental spills.
- A motivated staff striving to achieve 100% compliance with all regulatory requirements is focused on protecting the environment. The City of Mankato WWTP staff operates the wastewater plant in a highly effective and professional manner and consistently achieves regulatory compliance.
- Modifications made to the loading area for biosolids assures that no biosolids can wash into the storm drains during rain events. These changes were noted in the no-exposure permit the City of Mankato received for its storm water program.

Biosolids Value Chain-Monitoring and Measurement Report and Progress

Monitoring and measurement provides critical input to the organization relative to the effectiveness of its operational controls. This information helps to identify any weaknesses or other areas in which the program can be improved.

- Significant industrial users-During 2011, the industrial chemist worked with industries and regulators to insure compliance with local, state, and federal discharge laws and tracked industrial reports to insure accuracy and completeness. A soybean SIU has started its own pretreatment facility. This greatly reduced the CBOD and phosphorus loadings coming to the plant in November 2011. This should reduce the amount of Ferric Chloride being added to the waste stream and could possibly reduce the amount of biosolids produced.
- Industrial user discharges-The industrial chemist reviewed survey questionnaires sent to industrial users and monitored new industrial facilities. Significant industrial user permits were issued to those dischargers meeting the criteria of a significant user.
- Discharge authorizations-Discharge requests which are typically short in duration are handled through this process. This allows staff to characterize the nature of the proposed discharge to determine any detrimental impacts that might occur if discharge was allowed to the wastewater plant.
- Pollutant minimization-Efforts in this area have historically focused on the discharge of toxic metals, especially mercury. A molybdenum study has also been completed.

Wastewater Treatment and Solids Generation

- Solids screening and grit collection-Continued operation of a grinder prior to grit collection. This decreased the wet material sent to the landfill by 75%. It also greatly reduces the amount of rags and larger debris from getting to the pumps and therefore reduces pump wear.
- Primary Treatment-There was no change in primary treatment in 2011. A better mixing and aeration system was installed in the digester feed pit. This improved the DAF thickening abilities.
- Secondary Treatment- The fourth basin is scheduled for fine air diffuser replacements in summer of 2012.
- Sludge storage-Biosolids are held in the anaerobic digesters prior to dewatering by the belt filter press. Replaced heat exchanger tubes. This increases heat transfer to the biosolids

in the digester and helps with the temperature control needed for pathogen reduction.

Solids Stabilization and Handling

- Belt Filter Press-The belt filter press equipment operation was as expected with no process upsets during the year. A belt replacement is scheduled for 2012. Caked biosolids averaged 20.4%.

Biosolids End Use

- Land application-The City of Mankato WWTP had 100% land application of biosolids. New fields were sampled for future land applications.

Internal Audit

An internal audit of the City's BMP was conducted in 2011. There were a few minor non-conformances mainly dealing with BMP updates and minor spills. Corrective actions were written up and put into place.

Current Year Goals and Objectives

An important component of our Biosolids EMS is continual improvement. Annually goals are identified based on key outcomes, biosolids value chain, or BMP improvements. During the past year, staff determined the following goals would help us achieve these objectives.

Increase public awareness

- Hold an open house for interested parties.
- Monitor the number of hits to the website to see any increases.
- Continue to give tours to the public upon request.

Beneficial reuse

- Continue research options for end use of biosolids.
- Continue 100% land application of biosolids.
- An energy savings study is to be completed in 2012.

Regulatory Compliance

- Track pharmaceutical take back participation.
- Review permits with the goal of adding zero discharge of pharmaceuticals to the annual permits.

Environmental

- Clean digesters resulting in better mixing and better gas production as budget allows. Cleaning to be completed by 2015.